

Cytogenetic Characterization of the VERO Cell Line Based on Comparisons with the Subline; Implication for Authorization and Quality Control of Animal Cell Lines

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Abstract : The VERO cell line was established in 1962 from normal tissue of an African green monkey, *Chlorocebus aethiops* ($2n=60$), and has been commonly used worldwide for screening for toxins or as a cell substrate for the production of viral vaccines. The VERO genome was sequenced in 2014; however, its cytogenetic features have not been fully characterized as it contains several chromosome abnormalities and different karyotypes coexist in the cell line. In this study, the VERO cell line (JCRB0111) was compared with one of the sublines. In contrast to 59 chromosomes as the modal chromosome number in the VERO cell line, the subline had two peaks of 56 and 58 chromosomes. M-FISH analysis using human probes revealed that the VERO cell line was characterized by a translocation $t(2;25)$ found in all metaphases, which was absent in the subline. Different abnormalities detected only in the subline show that the cell line is heterogeneous, indicating that the subline has the potential to change its genomic characteristics during cell culture. The various alterations in the two independent lineages suggest that genomic changes in both VERO cells can be accounted for by progressive rearrangements during their evolution in culture. Both $t(5;X)$ and $t(8;14)$ observed in all metaphases of the two cell lines might have a key role in VERO cells and could be used as genetic markers to identify VERO cells. The flow karyotype shows distinct differences from normal. Further analysis of sorted abnormal chromosomes may uncover other characteristics of VERO cells. Because of the absence of STR data, cytogenetic data are important in characterizing animal cell lines and can be an indicator of their quality control.

Keywords : VERO, cell culture passage, chromosome rearrangement, heterogeneous cells

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